

REMARKS/ARGUMENTS

Claims 1-60 are pending in the present application. Claims 4, 5, 8, 10-12, 15, 19, 24, 27 and 30-60 have been withdrawn from consideration. Claims 1, 6, 14, 17, 18, 23, 26 and 29 have been amended. Claims 7, 9, 16, 20-22, 25 and 28 have been canceled. New claims 61-69 have been added. Applicants respectfully submit that no new matter has been introduced in the present amendment. Reconsideration is respectfully requested in light of the foregoing amendments and following remarks.

Rejections under 35 U.S.C. §112

Claims 1-3, 6, 7, 9, 13, 14, 16-18, 20-23, 25, 26, 28 and 29 have been rejected under 35 U.S.C. §112, second paragraph, as allegedly being indefinite, due to the lack of sufficient antecedent basis for certain elements of the claims. In order to further the prosecution of the presently claimed invention, Applicants have amended these claims to ensure that the limitations have proper antecedent basis. Accordingly, Applicants submit that the rejection for indefiniteness is overcome.

Rejections under 35 U.S.C. §102(b)

The Examiner has rejected Claims 1, 2, 6, 7, 9, 14, 16-18, 20-23, 25, 26, 28, and 29 under 35 U.S.C. §102(b) as allegedly being anticipated by any one of Cole (U.S. Patent No. 5,378,895), Schoenig (U.S. Patent No. 4,902,467), Untermyer (U.S. Patent No. 3,636,353), or Bernard (U.S. Patent No. 4,897,550).

Applicants' amended independent Claim 1 recites a method of detecting special nuclear materials in a container, comprising: a) irradiating the container with an energetic beam which induces fission in special nuclear materials, resulting in fission products; b) stopping the irradiating after a period of time; c) after the stopping, detecting gamma rays outside the container and recording energy data and temporal data; d) analyzing the energy data to determine an energy range for the gamma rays; e) analyzing the temporal data to determine an effective half-life; whereby it is determined that the container holds special nuclear materials when the energy range comprises values greater than an energy threshold level and the effective half-life is less than a half-life threshold value.

Applicants' amended independent Claim 29 recites a method of detecting special nuclear materials in a container, comprising the steps of: a) irradiating the container with an energetic beam which induces fission in special nuclear materials, resulting in fission products; b) stopping the irradiating after a period of time; c) after the stopping, detecting gamma rays outside the container and recording energy data and temporal data; d) analyzing the energy data to determine an energy range for the gamma rays; and e) analyzing the temporal data to determine an effective half-life; whereby it is determined that the container holds special nuclear materials when the energy range comprises values greater than 3.0 MeV and the effective half-life is approximately 25 seconds.

Cole discloses a method and device for assaying special nuclear materials based upon the prompt coincidence relationships that occur in the fission process. (abstract) The prompt coincidence mode can be described as declaring a nuclear fission event as having occurred if two or more pulses from two or more gamma-ray detectors, or two pulses from two or more neutron detectors, or one or more gamma rays and one or more neutron pulses occur within picoseconds (10^{-12}) of each other. (Col. 2, lines 22-27)

Cole did not disclose irradiating a container, stopping the irradiating after a period of time and, detecting gamma rays after the stopping, as recited by amended Claims 1 and 29. Nor did Cole disclose analyzing data to determine an energy range for the gamma rays and an effective half-life, as recited by amended Claims 1 and 29. As Cole did not disclose determining an energy range and an effective half-life, he also did not disclose determining that the container holds special nuclear materials when the energy range comprises values greater than an energy threshold level and the effective half-life is less than a half-life threshold value, as recited by amended Claim 1. As Cole did not disclose determining an energy range and an effective half-life, he also did not disclose to determine that the container holds special nuclear materials when the energy range comprises values greater than 3.0 MeV and the effective half-life is approximately 25 seconds, as recited by amended Claim 29.

Thus Cole failed to disclose every feature of amended Claims 1 and 29.

Schoenig discloses a method of determining enrichment concentration of nuclear fuel rods that included exposing fuel rods to a neutron flux to produce fissions and passing the

rods through detectors which measured the intensity of the resulting gamma rays. Intensity was measured as gamma ray counts. (Col. 6, lines 54-68) Schoenig did not disclose collecting energy or temporal data from the gamma rays. (Figure 3)

The method of Schoenig could not have been used to determine an energy range for the gamma rays or an effective half-life and to determine that the container holds special nuclear materials, as recited by amended Claims 1 and 29. Thus Schoenig failed to disclose every feature of amended Claims 1 and 29.

Untermeyer discloses a method of assaying nuclear reactor fuel that included irradiating the fuel with a penetrating beam of neutrons in a specific energy range, detecting and counting prompt fast events caused by the fission neutrons emitted by the fuel while simultaneously discriminating against the counting of neutrons in the energy range of the penetrating neutron beam, and comparing the number of events counted with counts from similar irradiation of calibrated samples. (Col. 5, line 71 – Col. 6, line 16) Untermeyer did not disclose collecting energy or temporal data. (Figure 5)

The method of Untermeyer could not have been used to determine an energy range for the gamma rays or an effective half-life and to determine that the container holds special nuclear materials, as recited by amended Claims 1 and 29. Thus Untermeyer failed to disclose every feature of amended Claims 1 and 29.

Bernard discloses an apparatus for characterizing fissile material that bombarded the material with a neutron source and detected spontaneous and delayed neutrons and gamma rays from fission induced by the neutrons. (Col. 2, lines 30-35) Bernard disclosed "...knowing both the number of delayed neutrons and the delayed gamma number, it is possible to form a ratio between them, which makes it possible to determine the composition of the fissile isotopes..." (Col. 2, lines 25-28) Bernard did not disclose collecting energy or temporal data from gamma rays.

The method of Bernard could not have been used to determine an energy range for the gamma rays or an effective half-life and to determine that the container holds special nuclear materials, as recited by amended Claims 1 and 29. Thus Bernard failed to disclose every feature of amended Claims 1 and 29.

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Applicants respectfully traverse the rejections and submit that Cole, Schoenig, Untermeyer, and Bernard each failed to disclose each and every feature of amended independent Claims 1 and 29, and so failed to anticipate these claims.

The dependent claims each depend from amended independent Claim 1 and therefore include all the features and limitations thereof. Furthermore, the dependent claims add further distinguishing features of particular utility. Accordingly, Applicants submit that the dependent claims are also allowable over Cole, Schoenig, Untermeyer, and Bernard, at least for the reasons set forth above.

New Claims

New claims 61-69 have been added to provide an adequate level of protection for the presently claimed invention. Applicants respectfully submit that the new claims are fully supported by the application as originally filed.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 925-472-5000.

Respectfully submitted,



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